AMENDMENTS TO THE CLAIMS

The following is a complete listing of the claims indicating the current status of each claim and including amendments currently entered as highlighted.

1. (previously presented)A microneedle device for transporting fluid across a biological barrier, the device comprising:

(a) a fluid transport configuration including:

(i) a substrate defining a substantially planar surface, and

(ii) a plurality of microneedles projecting from said substantially planar surface;

(b) an abutment member having at least one abutment surface for abutting the biological barrier, said abutment member configured to anchor a region of the biological barrier so as to oppose movement of the biological barrier parallel to a surface of the biological barrier; and

(c) a displacement mechanism mechanically linking between said abutment member and said fluid transport configuration, said displacement mechanism defining a path of movement of said fluid transport configuration relative to said abutment surface, at least part of said path of movement being such that said microneedles move in contact with the biological barrier in a direction having a non-zero component parallel to the surface of the biological barrier.

2. (previously presented)The device of claim 1, wherein each of said microneedles has a base-to-tip vector defined as a vector from a centroid of a base area of said microneedle to a centroid of a penetrating tip of said microneedle, said

microneedles being asymmetrical such that said base-to-tip vector is non-perpendicular to said substantially planar surface, a direction parallel to a projection of said base-to-tip vector on to said substantially planar surface being taken to define a penetration direction, and wherein at least part of said path of movement has a non-zero component along said penetration direction.

3. (previously presented)The device of claim 2, wherein each of said microneedles is formed such that a projection of said penetrating tip onto said substantially planar surface lies within said base area of said microneedle.

4. (previously presented)The device of claim 1, wherein each of said microneedles is formed with at least one side wall standing substantially perpendicular to said substantially planar surface and at least one wall inclined relative to a perpendicular to said substantially planar surface.

5. (previously presented)The device of claim 1, wherein each of said microneedles is formed with at least two side walls each having a substantially planar face, said side walls being positioned such that an angle between said faces as measured in a plane parallel to said substantially planar surface of said base is no greater than 90°.

6. (original) The device of claim 5, wherein said angle between said faces is between 30° and 70°.

7. (original) The device of claim 1, wherein each of said microneedles is formed with a conduit extending through at least part of said

microneedle and at least part of said substrate, said conduit being configured to provide a fluid flow path for transport of fluids through a hole in a biological barrier formed by said penetrating tip.

8. (original) The device of claim 7, wherein said conduit intersects a surface of said microneedle proximal to said penetrating tip.

9. (original) The device of claim 7, further comprising a flow actuation mechanism in fluid connection with said conduits and configured for generating a driving pressure of at least 1000 PSI so as to produce a high velocity fluid jet emerging from said conduits for penetrating into the biological barrier beyond a depth of penetration of said microneedles.

10. (original) The device of claim 1, wherein at least part of said at least one abutment surface is provided with adhesive for maintaining contact between said abutment surface and the biological barrier.

11. (original) The device of claim 10, wherein said path of movement carries said substantially planar surface from an initial position above said at least one abutment surface to a deployed position projecting below said at least one abutment surface for stretching the biological barrier across said substantially planar surface.

12. (original) The device of claim 1, further comprising a vibration generator associated with said fluid transport configuration and deployed so as to generate vibration of said fluid transport configuration so as to enhance penetration of said microneedles into the biological barrier.

13. (currently amended) A method for transporting fluid across a biological barrier comprising the steps of:

(a) providing a fluid transport configuration including:

(i) a substrate defining a substantially planar surface, and

(ii) a plurality of microneedles projecting from said substantially planar surface;

(b) positioning said fluid transport configuration in contact with the biological barrier; and

(c) displacing said fluid transport configuration so that said microneedles move in contact with said biological barrier along a path of movement having a non-zero component parallel to said substantially planar surface,

wherein each of said microneedles has a base-to-tip vector defined as a vector from a centroid of a base area of said microneedle to a centroid of a penetrating tip of said microneedle, said microneedles being asymmetrical such that said base-to-tip vector is non-perpendicular to said substantially planar surface, a direction parallel to a projection of said base-to-tip vector on to said substantially planar surface being taken to define a penetration direction, and wherein said path of movement has a positive component along said penetration direction.

14. (canceled)

15. (currently amended) The method of ~~claim 14,~~ claim 13, wherein each of said microneedles is formed such that a projection of said penetrating tip onto said substantially planar surface lies within said base area of said microneedle.

16. (previously presented)The method of claim 13, wherein each of said microneedles is formed with at least one side wall standing substantially perpendicular to said substantially planar surface and at least one wall inclined relative to a perpendicular to said substantially planar surface.

17. (previously presented)The method of claim 13, wherein each of said microneedles is formed with at least two side walls each having a substantially planar face, said side walls being positioned such that an angle between said faces as measured in a plane parallel to said substantially planar surface of said base is no greater than 90°.

18. (original) The method of claim 17, wherein said angle between said faces is between 30° and 70°.

19. (original) The method of claim 13, wherein each of said microneedles is formed with a conduit extending through at least part of said microneedle and at least part of said substrate, said conduit being configured to provide a fluid flow path for transport of fluids through a hole in a biological barrier formed by said penetrating tip.

20. (original) The method of claim 19, wherein said conduit intersects a surface of said microneedle proximal to said penetrating tip.

21. (original) The method of claim 19, further comprising generating a high velocity flow of fluid through a bore of the microneedle so as to form a fluid jet

with sufficient pressure to penetrate into the biological barrier to a total depth at least one-and-a-half times a penetration depth of said microneedles.

22. (previously presented)The method of claim 13, further comprising positioning at least one abutment surface in contact with said biological barrier, said displacing of said fluid transport configuration being performed relative to said abutment surface.

23. (original) The method of claim 22, wherein said at least one abutment surface is made to adhere temporarily to said biological barrier.

24. (previously presented)The method of claim 23, wherein said displacing of said fluid transport configuration carries said substantially planar surface from an initial position above said at least one abutment surface to a deployed position projecting below said at least one abutment surface so as to stretch the biological barrier across said substantially planar surface.

25. (original) The method of claim 13, further comprising inducing vibration of said fluid transport configuration so as to enhance penetration of the microneedles into the biological barrier.

26-52. (canceled)

53. (new) A method for transporting fluid across a biological barrier comprising the steps of:

(a) providing a fluid transport configuration including:

(i) a substrate defining a substantially planar surface, and

(ii) a plurality of microneedles projecting from said substantially planar surface;

(b) positioning said fluid transport configuration in contact with the biological barrier; and

(c) displacing said fluid transport configuration so that said microneedles move in contact with said biological barrier along a path of movement having a non-zero component parallel to said substantially planar surface,

wherein each of said microneedles is formed with at least one side wall standing substantially perpendicular to said substantially planar surface and at least one wall inclined relative to a perpendicular to said substantially planar surface.

54. (new) A method for transporting fluid across a biological barrier comprising the steps of:

(a) providing a fluid transport configuration including:

(i) a substrate defining a substantially planar surface, and

(ii) a plurality of microneedles projecting from said substantially planar surface;

(b) positioning said fluid transport configuration in contact with the biological barrier; and

(c) displacing said fluid transport configuration so that said microneedles move in contact with said biological barrier along a path of movement having a non-zero component parallel to said substantially planar surface,

wherein each of said microneedles is formed with at least two side walls each having a substantially planar face, said side walls being positioned such that an angle between said faces as measured in a plane parallel to said substantially planar surface of said base is no greater than 90°.

55. (new) The method of claim 54, wherein said angle between said faces is between 30° and 70°.

56. (new) The method of claim 13, wherein said path of movement is substantially parallel to said penetration direction.